Claims

[c1] 1. A curable composition comprising:

(a) an epoxy resin and curing agent therefor, wherein said epoxy resin is essentially free of bromine atoms;

(b) a flame retardant additive essentially free of phenolic groups and of epoxy groups, wherein said flame retardant is a condensation product of (i) a brominated phenol or a mixture of brominated phenols with (ii) a cyanuric halide;

(c) a thermoplastic resin; and

(d) a bismaleimide.

[c2] 2. The curable composition of claim 1, wherein said flame retardant additive has a bromine content greater than 20%.

[c3] 3. The curable composition of claim 1, wherein said flame retardant additive is 1,3,5-tris(2,4,6-tribromophenoxy)triazine.

[c4] 4. The curable composition of claim 1, wherein said flame retardant additive is 2,2'-[(1-methylethylidene)bis[(2,6-dibromo-4,1-phenylene)oxy]]bis[4,6-bis [(2,4,6-tribromophenyl)oxy]-1,3,5-triazine].

[c5] 5. The curable composition of claim 1, wherein said flame retardant additive is soluble in toluene at a concentration of greater than 15 g/100ml of toluene at a temperature of 50 ° C.

[c6] 6. The curable composition of claim 1, wherein said epoxy resin is a glycidyl ether resin or a mixture of glycidyl ether resins containing, on average, greater than 2 epoxy groups per molecule.

[c7] 7. The curable composition of claim 1, wherein said epoxy resin is a mixture of:

(a1) an epoxy resin containing on average less than or equal to 2 glycidyl groups per molecule; and

(a2) an epoxy resin containing greater than 2 glycidyl groups per molecule.

[c8] 8. The curable composition of claim 1, wherein said thermoplastic resin has a Tg greater than 120 ° C.

[c9] 9. The curable composition of claim 1, wherein said thermoplastic resin has a dissipation factor of less than 0.010 measured at 1 MHz at room temperature.

[c10] 10. The curable composition of claim 1, wherein said thermoplastic resin has been directly isolated from solution after polymerization.

[c11] 11. The curable composition of claim 1, wherein said thermoplastic resin is a poly(phenylene ether).

[c12] 12. The curable composition of claim 11, wherein said poly(phenylene ether) has a weight average molecular weight ranging from about 3,000 to 35,000 g/mol.

[c13] 13. The curable composition of claim 11, wherein said poly(phenylene ether) has a weight average molecular weight ranging from about 3,000 to 35,000 g/mol.

[c14] 14. The curable composition of claim 11, wherein said poly(phenylene ether) has been melt processed at a temperature ranging from about 200 ° to 350 ° C.

[c15] 15. The curable composition of claim 11, wherein said poly(phenylene ether) is hydroxy functional.

[c16] 16. The curable composition of claim 1, wherein said thermoplastic resin is one or more of a poly(phenylene ether) or a poly(styrene- *co* -maleic anhydride).

[c17] 17. The curable composition of claim 1, wherein said thermoplastic resin is a reaction product of a poly(phenylene ether) and a peroxide.

[c18] 18. The curable composition of claim 1, wherein said thermoplastic resin is a reaction product of a poly(phenylene ether), a peroxide, and a bisphenol.

[c19] 19. The curable composition of claim 1, wherein said thermoplastic resin is a polyimide.

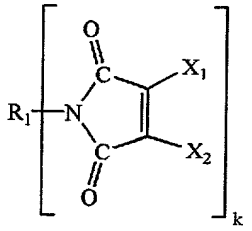
[c20] 20. The curable composition of claim 1, wherein the curable composition further comprises one or more of an organic reinforcement, an inorganic reinforcement, or a filler.

[c21] 21. The curable composition of claim 1, wherein the curable composition is essentially free of homopolymers of styrene.

[c22] 22. The curable composition of claim 1, wherein the epoxy resin is a multifunctional glycidyl ether.

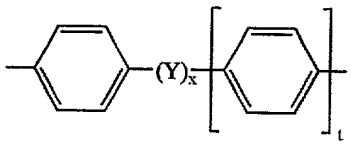
[c23] 23. The curable composition of claim 22, wherein said multifunctional glycidyl ether is selected from the group consisting of epoxidized phenol-formaldehyde novolacs, epoxidized cresol-formaldehyde novolacs, epoxidized alkylphenol-formaldehyde novolacs, epoxidized 1,1,1-tris(4-hydroxyphenyl)ethane, epoxidized 1,1,2,2-tetra(4-hydroxyphenyl) ethane, epoxidized phenol-dicyclopentadiene novolacs, and epoxidized phenol-benzaldehyde novolacs.

[c24] 24. The curable composition of claim 1, wherein said bismaleimide has the formula



(IV)

wherein k is an integer of at least 2; X_1 and X_2 are identical or different and each represents a hydrogen atom, a halogen atom or a lower alkyl group; and R_1 represents an aromatic or aliphatic organic group having a valence of k, which is selected from the group consisting of a linear or cyclic aliphatic hydrocarbon group having 4 to 16 carbon atoms, a monocyclic or fused ring aromatic hydrocarbon group, a triazine ring, a moiety resulting from the removal of the amino group from a condensation product of aniline and formaldehyde and a polybenzene group represented by the following formula:



(V)

wherein x represents 0 or 1 and when x represents 1, Y represents a linear, branched or cyclic aliphatic hydrocarbon group having 1 to 14 carbon atoms, a phenylene group, a xylylene group, an oxygen atom, a sulfur atom, a carbonyl group, a sulfonyl group, a sulfinyl group, an alkyleneoxyalkylene group, a

phosphonyl group, a phosphinyl group, or an imino group; and t is an integer of 1 or 2, or the homoprepolymer thereof obtained by reacting at least one of said polyfunctional maleimides under heat and stopping the reaction before the reaction mixture is gelled.

[c25] 25. A curable composition comprising:

(a) an epoxy resin and curing agent therefor, wherein said epoxy resin is a glycidyl ether resin or mixture of glycidyl ether resins containing, on average, greater than 2 epoxy groups per molecule;

(b) 1,3,5-tris(2,4,6-tribromophenoxy)triazine and/or 2,2'-[(1-methylethylidene) bis[(2,6-dibromo-4,1-phenylene)oxy]]bis[4,6-bis[(2,4,6-tribromophenyl)oxy]-1,3,5-triazine];

(c) a poly(phenylene ether) resin; and

(d) a bismaleimide.

[c26] 26. A curable composition comprising:

(a) an epoxidized cresol-formaldehyde novolac resin;

(b) 1,3,5-tris(2,4,6-tribromophenoxy)triazine; and

(c) a poly(phenylene ether) resin having a number average molecular weight ranging from about 1,000 to 15,000 g/mol; and

(d) a bismaleimide.

[c27] 27. A cured composition comprising a cured residue of a curable composition comprising:

(a) an epoxy resin and curing agent therefor, wherein said epoxy resin is essentially free of bromine atoms;

(b) a flame retardant additive essentially free of phenolic groups and of epoxy groups, wherein said flame retardant is a condensation product of (i) a brominated phenol or a mixture of brominated phenols with (ii) a cyanuric halide;

(c) a thermoplastic resin; and

(d) a bismaleimide.